Claims

1. A method comprising:

receiving a signal that includes information germane to total reflectance of a wafer;

comparing the information to information in a database; and

determining one or more characteristics of the wafer based on the comparing wherein the one or more characteristics are selected from a group consisting of thickness and surface characteristics.

2. The method of claim 1 wherein the database includes calculated information.

3. The method of claim 1 wherein the database includes measured information.

4. The method of claim 1 wherein the signal includes spectral information.

5. The method of claim 1 wherein the database includes spectral information.

6. The method of claim 1 wherein the database includes calculated spectral information.

7. The method of claim 1 wherein the signal includes spectral information and further comprising selecting segments of the spectral information.

8. The method of claim 1 wherein the database includes spectral information for a variety of wafer thicknesses.

9. The method of claim 1 wherein the database includes spectral information for a variety of wafer surface characteristics.

10. The method of claim 1 wherein the database includes spectral information for a variety of wafer thicknesses and a variety of wafer surface characteristics.

11. The method of claim 1 wherein the signal is acquired using a non-contact technique.

12. The method of claim 1 wherein the signal is acquired using an optical technique.

13. The method of claim 1 wherein the signal is acquired using a non-contact, optical technique.

14. The method of claim 1 wherein the receiving, the comparing and the determining occur in less than approximately 100 ms.

15. The method of claim 1 wherein the determining comprises mapping characteristics of the wafer.

16. The method of claim 1 wherein the one or more characteristics includes thickness of the wafer.

17. The method of claim 1 wherein the one or more characteristics includes surface roughness of the wafer.

18. The method of claim 1 wherein the signal is acquired using a Sopori reflectometer.

19. The method of claim 1 wherein the signal is acquired using a PV reflectometer.

20. The method of claim 1 wherein the surface characteristics of the wafer are known a priori.

21. The method of claim 1 wherein the signal includes information pertaining to one or more surfaces of the wafer.

22. The method of claim 1 wherein the signal includes information pertaining to one or more surfaces of the wafer and to one or more thicknesses of the wafer.

23. The method of claim 1 wherein the wafer filters shorter wavelengths of incident radiation.

24. The method of claim 1 wherein the comparing includes performing a regression analysis.

25. The method of claim 24 wherein the performing a regression analysis yields a best fit.

26. The method of claim 1 wherein the comparing includes selecting a total reflectance value and correlating the selected value to a wavelength.

27. The method of claim 1 wherein the comparing includes selecting a total reflectance value and correlating the selected value to a wavelength within a range of wavelengths.

28. The method of claim 27 wherein the range of wavelengths corresponds to a range associated with multiple internal reflections in the wafer.

29. The method of claim 1 wherein the comparing includes comparing wavelengths.

30. The method of claim 1 wherein the comparing includes comparing reflectances.

31. The method of claim 1 wherein the comparing includes comparing wavelengths and reflectances.

32. The method of claim 1 wherein the comparing includes selecting a total reflectance value.

33. The method of claim 1 further comprising acquiring the signal.

34. The method of claim 33 wherein the acquiring includes spectral acquisition.

35. The method of claim 33 wherein the acquiring includes positioning the wafer on a reflective support.

36. The method of claim 33 wherein the acquiring includes coating a surface of the wafer with a reflective material.

37. The method of claim 33 wherein the acquiring includes positioning a narrow-band filter between the wafer and a detector to filter radiation emanating from the wafer.

38. The method of claim 37 wherein the detector detects radiation having amplitude inversely proportional to thickness of the wafer.

39. The method of claim 1 further comprising generating an image of the wafer.

40. The method of claim 1 wherein the signal is acquired using a reciprocal approach.

41. A method comprising:

illuminating a wafer with radiation from one or more radiation sources positioned at a first altitudinal angle from the wafer;

measuring a first reflectance;

illuminating the wafer with radiation from one or more radiation sources positioned at a second altitudinal angle from the wafer;

measuring a second reflectance; and

determining thickness or surface characteristics of the wafer.

42. The method of claim 41 wherein the first altitudinal angle is less than the second altitudinal angle and the determining determines surface characteristics based on the first and second reflectances.

43. A method for operating a reflectometer comprising:

determining if a wafer has substantial surface texture;

if the wafer has substantial surface texture then illuminating the wafer using one or more radiation sources positioned at a first altitudinal angle; and

if the wafer does not have substantial surface texture then illuminating the wafer using one or more radiation sources positioned at a second altitudinal angle, wherein the second altitudinal angle is greater than the first altitudinal angle.

44. A method comprising:

measuring reflectance of a wafer; and

based on the reflectance, selecting one or more radiation sources from a group of radiation sources positioned at a plurality of altitudinal angles.

45. The method of claim 44, further comprising illuminating the wafer using the one or more selected radiation sources.

46. The method of claim 45, further comprising measuring reflectance of the wafer.

47. A method of operating a reflectometer comprising:

rotating a section of a reflectometer chamber to position one or more radiation sources with respect to geometry of a wafer.

48. The method of claim 47 wherein the rotating aligns one or more of the radiation sources with a dominant axis of the wafer.

49. A reflectometer chamber comprising:

a base defining a horizon;

one or more first radiation sources positioned at an altitudinal angle equal to or greater than approximately 70° from the horizon; and

one or more second radiation sources positioned at an altitudinal angle less than approximately 70° from the horizon.

50. The reflectometer chamber of claim 49 further comprising an aperture at an altitudinal angle of approximately 90°.

51. The reflectometer chamber of claim 49 further comprising a azimuthally rotatable section.

52. The reflectometer chamber of claim 51 wherein the first radiation sources are positioned on the azimuthally rotatable section.

53. The reflectometer chamber of claim 49 wherein a section of the chamber allows for azimuthal rotation of the first radiation sources.

54. The reflectometer chamber of claim 49 wherein a section of the chamber allows for azimuthal rotation of the second radiation sources.

55. The reflectometer chamber of claim 49 wherein a first section of the chamber allows for azimuthal rotation of the first radiation sources and a second section of the chamber allows for azimuthal rotation of the second radiation sources.

56. An element for use in a reflectometer comprising:

a first aperture capable of receiving a fiber to transmit reflected radiation to a detector;

a second aperture capable transmitting reflected radiation to an imager; and

wherein the element is slidably positionable with respect to an aperture of the reflectometer to thereby substantially align the first

aperture with the aperture of the reflectometer or to substantially align the second aperture with the aperture of the reflectometer.

57. The element of claim 56 wherein the reflectometer comprises a Sopori reflectometer.

58. The element of claim 56 wherein the element comprises a set of rails positionable in grooves of supporting arms attached to the reflectometer.